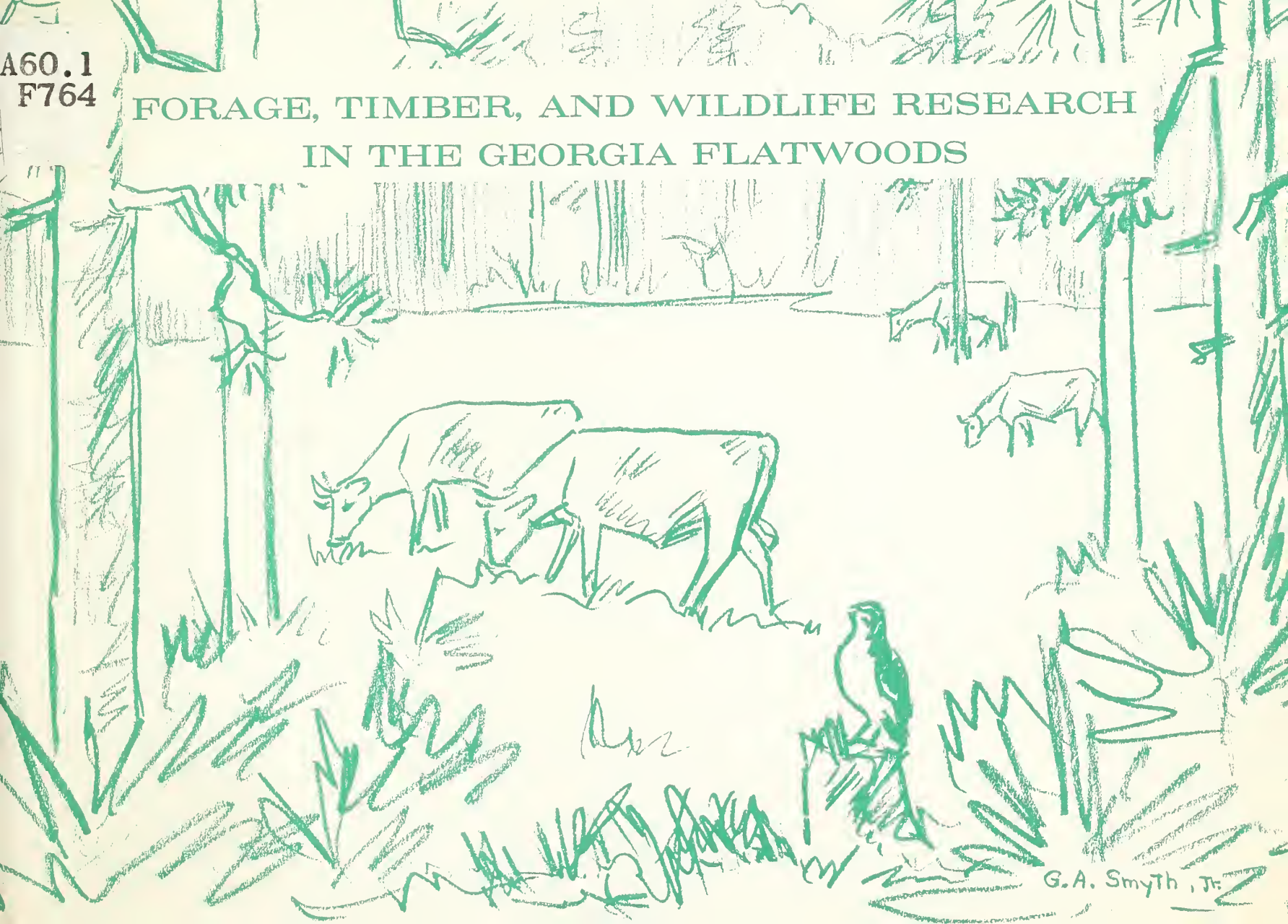
FORAGE, TIMBER, AND WILDLIFE RESEARCH IN THE GEORGIA FLATWOODS



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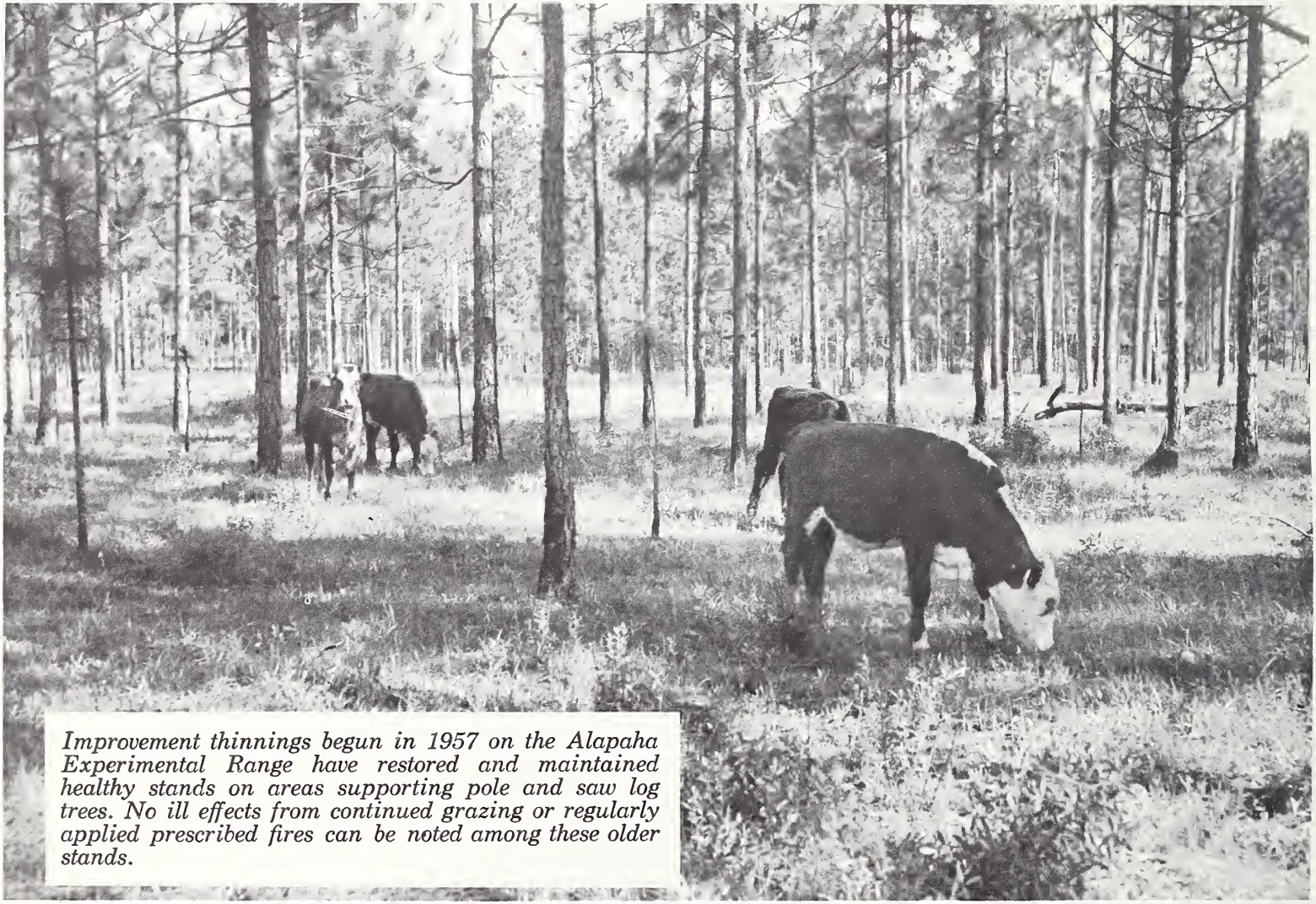
Main buildings of the Georgia Coastal Plain Experiment Station at Tifton, Georgia.



Improvement thinnings begun in 1957 on the Alapaha Experimental Range have restored and maintained healthy stands on areas supporting pole and saw log trees. No ill effects from continued grazing or regularly applied prescribed fires can be noted among these older stands.

Forest lands of the south Georgia Coastal Plain have a rich potential for sources of income that can bolster pulpwood and timber revenues. This booklet describes nearly three decades of cooperative research carried on at Tifton by the Georgia Coastal Plain Experiment Station and the U. S. Department of Agriculture's Forest Service and Agricultural Research Service. The work has helped many landowners to increase income from timber and beef cattle. New investigations in wildlife show that quail and other game can be vastly increased by scientific management of game food plants and habitat. Such management combined with lease of hunting rights looks like a promising supplement. In fact, some owners are already trying it.

Working together at the Coastal Plain Experiment Station, especially on the Alapaha Experimental Range, researchers in the fields of agronomy, animal husbandry, forestry, animal nutrition, plant genetics, and ecology have made pioneering advances in expanding the resource benefits from woodland ranges. Managed pastures, carefully planned for experimental purposes in connection with wildland grazing, and most carefully developed herds provide unique facilities for conducting year-round grazing experiments.

PAST ACCOMPLISHMENT

Back in 1940, when forest grazing research began at Tifton, it was the general practice of forest owners in the Georgia Coastal Plain to graze native cattle on native range year-round. The cattle were skinny, hardy creatures such as one seldom sees nowadays; and they had to be, for conditions were very rough. The average woodland grazing owner figured that returns were low, but not much investment was required and whatever he took in from the sale of his low-grade beef was profit. In those days, such an operation was taken for granted as being most practical, and nobody worried much about low calf crops and small, low-grade calves. The pulpwood market had not blossomed, timber was cheap, land also was very much cheaper than now, and the age of intensified agriculture was still around the corner.

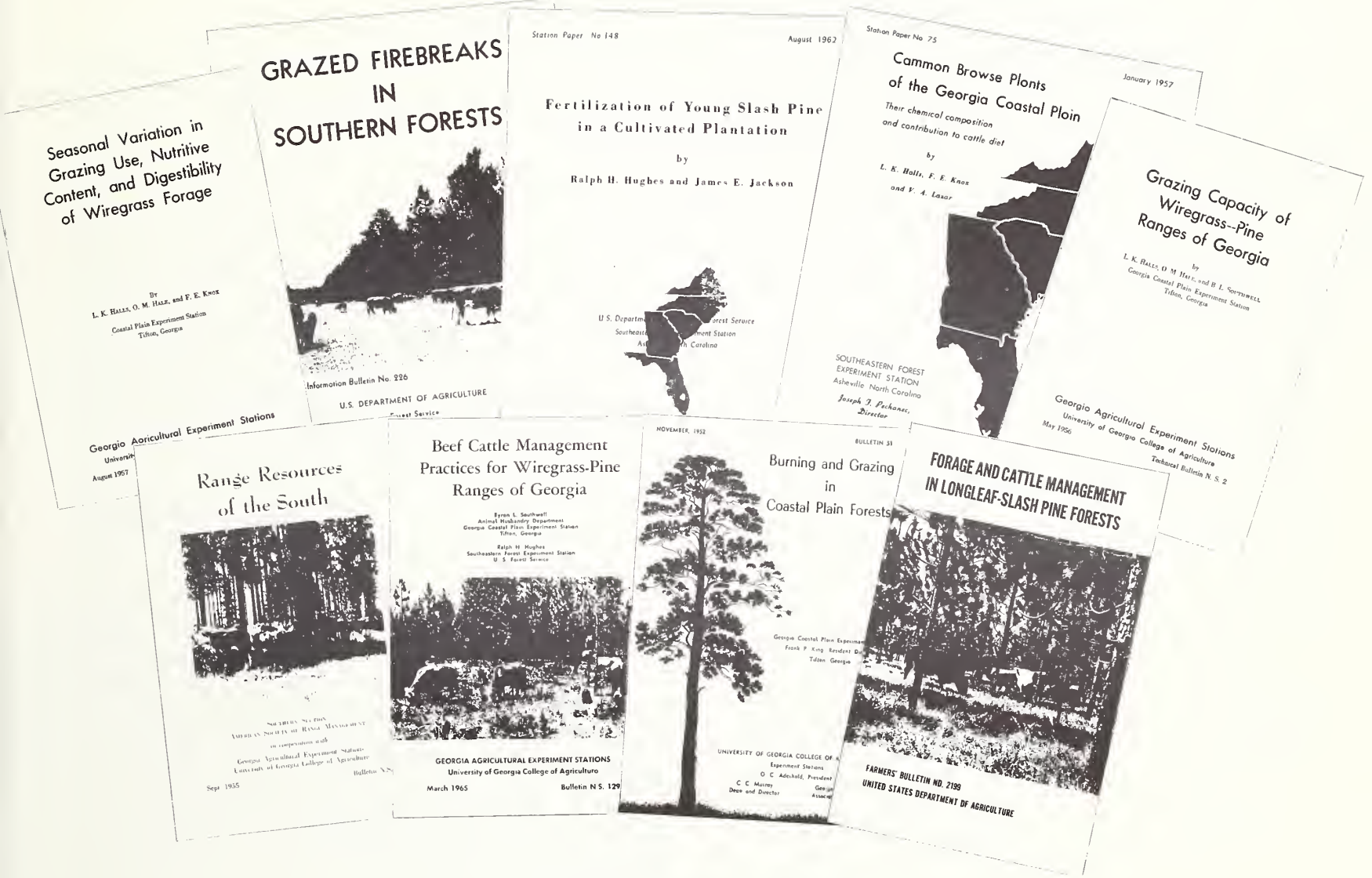
Early researchers soon recognized the need for at least minimum supplementation. At that time, the principal difficulty in forest grazing operations of lower Georgia was that, however hardy the pineywoods cattle might be, thousands of them starved to death in the woods each winter.

Studies have been under way now for nearly 25 years at Tifton, aimed at finding the cheapest, quickest, most effective ways of speeding tree growth, improving forage, and increasing the production of beef on forest land. These products are so closely related, that it is often necessary to work with all of them simultaneously. Over the years, the experimental herds at Alapaha have gone from an annual calf crop of 57 percent and average weaned weight of 272 pounds to present-day 76 percent calf crop and 427 pounds weaned weight.

It was thought at first that the addition of phosphorus and calcium in steamed bone meal and salt would result in great gains for cattle. But the cattle most in need of supplements were usually pushed away from the trough, being shy and weak. We find that grazing habits are so diverse this source of supplement is not dependable. Technical Bulletin N. S. 11, "Seasonal Variation in Grazing Use, Nutritive Content, and Digestibility of Wiregrass Forage," issued by the Georgia Agricultural Experiment Stations and authored by Halls, Hale, and Knox, did much to pinpoint mineral deficiencies. Studies of protein supplement led toward attempts to improve native forage, not only by burning the native wiregrass to make it more nutritious but by fertilizing, introducing new plants, and by plant breeding to create improved forage varieties.

For every success there were many failures. When we didn't burn, the range deteriorated. When we did burn, we destroyed most of our little trees and some big ones before we learned how and when to fire the woods. A promising move was to introduce such desirable plants as big trefoil, lespedeza, and white Dutch clover into wiregrass ranges of low nutritive value. Under rigorous woods conditions these improved plants needed fertilizer, and we did a lot of chopping with disk harrows to pave the way for them too. What we arrived at was mostly blackberries and briars vastly stimulated by the fertilizer. Such adverse factors as low fertility, drought effect in sandy soils, the competition of native vegetation, and attacks by insects and disease made it impossible for the improved plants to survive on forest ranges.

Heaviest calves are produced when cows are furnished a combination of improved pasture and burned forest range. Herds with 0.6 acre of improved pasture in the spring and summer and 10 acres of burned forest range per cow produced 457-pound calves.



A sampling of Tifton publications.

Alapaha Experimental Forest corral and one of the herds. Good cattle management requires frequent handling.

Large-scale success, however, attended work by plant scientists in developing Coastal Bermuda and Pensacola Bahiagrass, both efficient users of fertilizer. Coastal Bermudagrass, now planted on 6 million acres of improved land over the Gulf Coast States, was developed by Dr. Glenn Burton and has become one of the most important pasture grasses in the South. This new forage plant, grown on improved pastures and for hay, has done much to fill the gap during the winter months when woods cattle require heavy supplementation if they are to achieve proper gains. Spectacular progress has also been made in cattle management and breeding under the direction of B. L. Southwell. Some 20 years ago improved strains began to be introduced. Work by Southwell and others showed that part-Brahma cattle were more productive than straight Hereford, Angus, or Shorthorn blood lines under flatwoods conditions. By introducing these established beef strains into certain carefully controlled breeding programs, researchers achieved consistently rewarding gains.

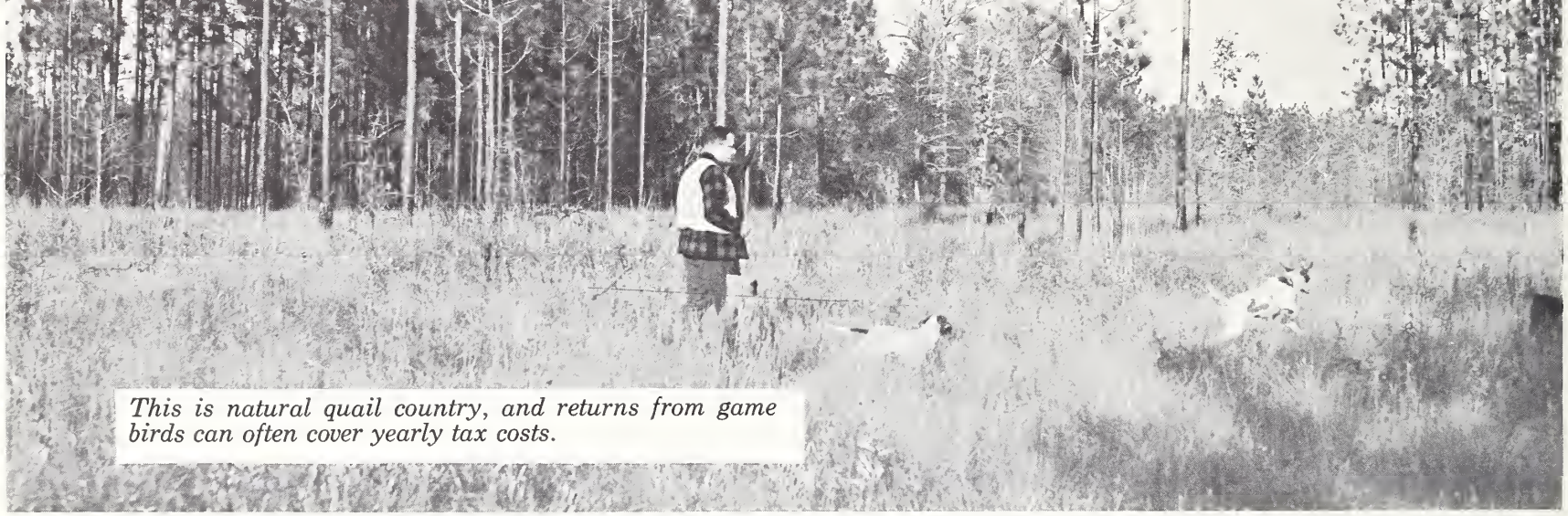
Step by step mineral supplementation, herd management, and forage management, including improved pasture, have been intensified. Studies of grazing capacities, largely on the Alapaha Experimental Range, showed that acreage allotments to cattle would have to be increased and that season of grazing on native range had to be shortened. Studies of burned ranges accurately measured the nutritional contribution of wiregrass and other forage species and pointed out the necessity of maintaining rigid burning schedules for effective rotational grazing and balanced use between native range and supplemental pasture.

Annual production of Coastal Bermudagrass fertilized at the rate of 200 lbs. N, 100 lbs. P_2O_5, and 100 K_2O was 4500 pounds per acre in this 8-year-old slash pine plantation.

The aim of all these studies was to provide landowners with supplemental returns from their forested ranges. Research results dealing with grazing capacity, chemistry, and the nutritional contribution of important plants, cattle requirements, performance, and burning schedules have enabled many owners to hold and improve their lands who could not otherwise have done so.

During this time prices of land and timber were going up and the pulpwood market was being established as a strong factor. Old fields no longer needed in the agricultural economy of the New South were being planted, largely to slash pine. Soon, landowners with holdings in the flatwoods were seeking improvement measures that would bring some early income from lands where slash-longleaf stands were developing. During this same span of years the trend in timber production has been toward shorter rotations. Instead of 50 to 60 years we have come to think of 30 as the norm for pulp products. This does not apply to all timbered acreage; some sections of the pineywoods, mostly the better sites, have been held through pulp rotations profitably and are being kept in saw log and pole production, and recently we have seen the beginnings of a major new force in southern timber economy—the southern pine plywood market. Early plantations were closely spaced, but as knowledge has expanded so has the spacing, and with it an opportunity to use the land for other purposes while the timber grows. The landowner's vital question is not only how to use the grazing resource in a timber economy, but how to use both resources together and perhaps reach for some wildlife production too.

Plantation during its ninth growing season in the longleaf-slash pine flatwoods. Wide spacing allows for rapid development.



This is natural quail country, and returns from game birds can often cover yearly tax costs.

Fifty years ago quail were the object of management attention on the part of a few wealthy plantation owners. As the trees have been growing up and interest in wild land grazing has moved to a highly complex management system, the demands on the South's woodlands for recreation have skyrocketed. Through the years, quail have been the most important game. But deer herds are a promising resource on many southern ranges. With the passage of time, the economic potential from game resources has taken on a new dimension. As the "dog-hair" 6 x 6 plantations give way to wide spacing and genetically superior trees, the opportunities for high legume seed production and favorable shooting conditions are pressed upward. Of limited dollar worth yesterday, quail alone can now cover taxation on many acres. As a practice, intensive game habitat management is spreading rapidly over the South. A few owners are already managing for quail and getting as much as a dollar a year per acre for shooting rights. Diversified land typified by Alapaha Experimental Range conditions now favors study to increase the production of turkeys, deer, and quail.

With each additional resource demand, the picture becomes increasingly complex. For instance, summer burns favor the control of undesirable understory plants but destroy young quail and quail nests; cattle can be run in newly established plantations to utilize heavy production of introduced grass foliage but we run a high risk of tree damage. Fertilizer greatly increases the total production on every acre dedicated to intensive plantation management, but we increase disease and insect attacks. Putting together the pieces of this timber-cattle-wildlife puzzle is the job of specialized researchers.

Test plots of clean-cultivated longleaf pine at end of seventh growing season averaged over 14 feet tall.

FUTURE OPPORTUNITY

Forage, timber, and wildlife are now predominant resources on 18 million acres of pineywoods. Forest range provides some forage for most of the 2 million beef cattle in Florida and southern Georgia. Managed stands are also producing ⅕ to 1 cord of pulpwood per acre per year. In addition, the same areas produce one quail per 2 to 10 acres, as well as deer herds that have been increasing locally.

Landowners are under pressure to obtain greater returns to offset higher taxes and other costs; consequently, they are seeking opportunities for more profitable combinations of resource use. The overriding problem is to learn how to combine cattle and timber management while developing wildlife production.

Multi-use on extensive areas is being impeded, however, by soil mineral deficiency, poor soil moisture relations, improper use of fire, certain undesirable site-preparation techniques, and undesirable brush competition. All of these problems and others are being worked on.

Saw-palmetto and gallberry interfere with pine regeneration and forage production on about 12 million acres. The cut-and-plant forestry of recent years, with 30-year instead of the former 50-year

rotations, has had a great impact on palmetto and gallberry. Present methods of site preparation assist the growth of gallberry, in that disk harrows cut up the rhizomes and spread their growth. Many expensive attempts to check this plant have met with failure. Other problems prevail for palmetto. Like gallberry, it resprouts vigorously after repeated burning, and is apparently a fire subclimax species where ranges are burned no more frequently than once in 2 years during the winter. We have already learned a great deal about fire, chemicals, and the cost of effective control measures, but the cost remains high. We are now engaged in exhaustive studies of the life history, autecology, and growth habits of these two principal understory pests, and are seeking out weak spots in their life processes. Forage, timber, and wildlife habitat improvement depend on the success of these basic studies. If we can find simple and effective answers, they will be worth millions.

Meanwhile, intensive studies are in progress to promote the growth of such important game food plants as partridgepea. It has been proven that increasing quail food increases quail, and we have evidence to show that the Georgia flatwoods prior to their long-continued burning and grazing history produced a considerable inventory of panicums, lespedezas, desmodiums, and other game food plants whose widespread reestablishment is being investigated.

Gallberry and saw-palmetto hinder effective management of the flatwoods. They compete with more valuable forage and game food plants, act as severe obstacle to naval stores operations, and greatly increase the danger of woods fires.

While prescribed fire keeps gallberry in check, other methods are needed to reduce or eliminate understory competition.

Number and kind of important game-food plant seeds are measured by careful analysis of soil samples, in cooperation with the International Paper Company. Although many legume seed remain viable for 50 or more years in the soil, they are apparently quite reduced or absent in many areas of the flatwoods. We are trying to find why.

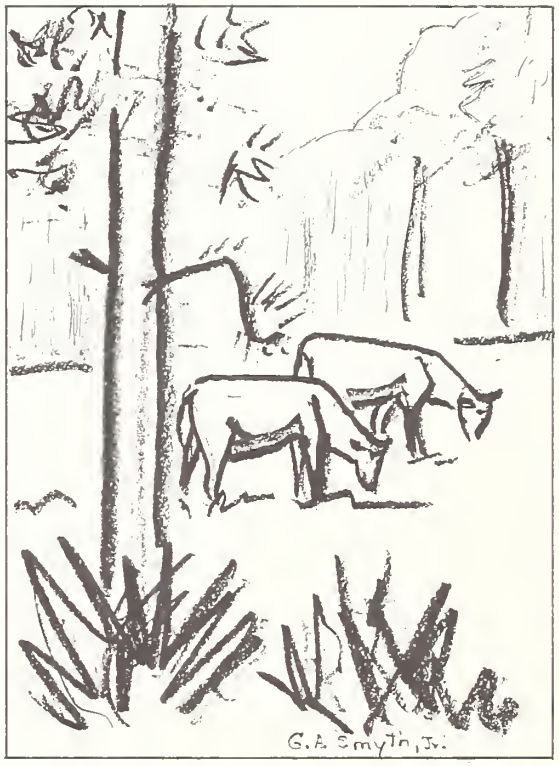
Controlled shading of partridgepea in replicated nursery plots at International Paper Company's Southlands Experiment Forest and at the Alapaha Range is demonstrating optimum growth requirements for this important quail food.

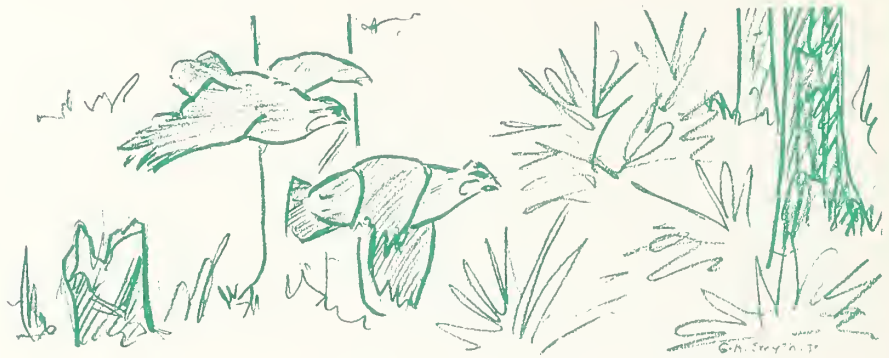
The use of pasture crops in wide-spaced plantations now being tested on the Alapaha may provide needed acreage of improved pasture for a balanced grazing program. We must learn how to adjust spacing, acreage treated, cutting activities, and grazing rotations to obtain necessary forage, thus withdrawing from multi-resource production the least possible acreage of single-use permanent pastures. Pensacola Bahiagrass is shade tolerant and good under pine. We will soon be cutting hay along rows of genetically superior pines planted 20 x 20 or 30 x 30—clones selected for rapid growth, small limbs, and good form. Heavy hay crops to supplement woods cattle may be possible for the first three or four years after tree planting, and then

Study of intensive culture is aimed at ways and means of getting trees off to a fast start so that they will reach cow-resistant size as soon as possible.

as the crowns close, the trees will shade cattle on this improved pasture. Our studies will show how soon cattle can be turned onto these pastures without excessive damage to the tree-crop saplings. This will be true 2-story agriculture. Eventually, the trees will shade out some of the grass, but by developing proper rotations we expect to have other, new grass plots coming on every year or two, thus maintaining a feasible and profitable system indefinitely.

In the new era of research activity opening up at Tifton the basis of action consists—even more than formerly—of integrated land use. All present expanded forest research is based on a combination of returns. Putting together the pieces of this complex biological puzzle requires much skill. Also, high levels of investment require high levels of knowledge.





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